REMARKS

Process claims restricted out in the parent application as a result of the requirement for restriction of January 6, 2003 in that application are presented in this divisional application. Since the process claims 6-11 were product dependent, they have been rewritten as new claims 12-19. Former claims 1-5 have also been rewritten as new claims 20-24 dependent on new main process claim 12. The new claims avoid improper "preferably" and "especially" clauses and place the claims in a more traditional U.S. format. Examination of claims 12-24 in this divisional application is therefore requested.

Applicants' invention as set forth in claim 12, relates to a process for the combined performance of a first physical material separation process with a chemical or biological process or with a second physical material separation process which is different from the first physical separation process comprising carrying out the combined process in the presence of structured multi-purpose packings having material separation elements and second functionality elements arranged in alternate layers, the material separation elements having a profiled surface, and each of the second functionality elements having two or more closed chambers provided on top of each other and filled with a physically, chemically or biologically active packing material, a space being provided between any two of the chambers, which space is bridged by a section for conducting a liquid, wherein the walls of the chambers of the second functionality elements are of a polymeric material.

In the Office Action of November 5, 2003 in the parent application, the Examiner believed that claims drawn to the packings per se were obvious over DE 19701045 to

Gorak et al. (hereafter Gorak) in view of U.S. Patent No. 5,431,890 to Crossland et al. (hereafter Crossland).

As noted by the Examiner, Gorak teaches all of the elements and features of the structured multi-purpose packings except that the walls of the chambers of the second functionality elements of the claimed packings are of a polymeric material. As set forth in claims 20 and 21, the polymeric material can be a polyamide, preferably nylon, a polyolefin, preferably polyethylene or polypropylene, or a halogenated polyolefin such as polytetrafluoroethylene or polyvinyl chloride. In Gorak, the walls of the chambers of the second functionality elements are of metal-wire cloth. See the discussion of Gorak on page 3, lines 27-34 of the present specification.

Crossland was cited to show that in a catalytic environment, polymeric mesh, of for example nylon or Teflon, is considered the functional equivalent of metal screen wire, referring to column 2, lines 22-30 of Crossland.

The Examiner therefore believed that it would be obvious to use the nylon polymeric mesh of Crossland instead of the metal-wire cloth of Gorak as the material for the walls of the chambers of the second functionality elements in the claimed structured multi-purpose packings.

Perhaps it might be obvious to make the substitution proposed where only a chemical process carried out in the presence of the packings is being considered. In fact, this is exactly what Crossland teaches when he states that metal screen wire and polymeric mesh are the functional equivalent.

However, the process set out in claim 12 is a physico-chemical process and not just a chemical process. The distinction between the two lies in the fact that a physico-

chemical process is characterized by the physical behavior of the substances involved (e.g., distillation, rectification, etc. – see page 6, line 19), and a chemical process by the chemical reaction between the substances involved. Note that claim 12 is drawn to a combined process requiring both a physical material separation process and, inter alia, a chemical process. One skilled in the art might have known from Crossland that the substitution of polymeric material for wire mesh would have had little or no effect on the chemical reaction being carried out in the presence of the packings, consistent with the teachings of Crossland that in a catalytic distillation process wire mesh and polymers are "equivalent materials." See, for instance, column 4, lines 7 and 8 of Crossland.

However, applicants have demonstrated in the Examples of the present application that using polymeric materials for the walls of the second functionality elements of the structured multi-purpose packings resulted in advantages compared to the metal wire mesh of Gorak when a physical process was also being carried out. Consequently, the polymeric materials must have had an unexpected effect on the physical behavior of the reactants in the chemical process being carried out.

These advantages are clearly demonstrated in the Examples of the present application (see Examples 1 and 2 versus Comparative Examples 1 and 2 on page 13). As discussed therein, Comparative Examples 1 and 2 are multifunctional packing materials like Gorak where the walls of the chambers of the second functionality elements are made of steel, whereas Examples 1 and 2 are identical multifunctional packing materials where the walls of the chambers of the second functionality elements are instead made of polyethylene fabric. The packings were then used in a reactor for

the preparation of tertiary amyl alcohol (TAA) from isoamylene and water. The conditions of the reaction in the reactor and the results of it are set forth in Table 1.

As can be seen from Table 1, the TAA production was significantly better, using identical amounts of isoamylene as the feed stream, when the packings of the invention were used compared to when packings similar to Gorak were used (nearly 40% higher at the higher feed rate of isoamylene).

There is nothing in Crossland to suggest that these improved results could be obtained when polymeric material is used in place of wire mesh, particularly when Crossland teaches they are equivalent. Applicants, however, have unequivocally demonstrated they are not equivalent.

In the noted Office Action, the Examiner took the position that while perhaps the examples may show the unobviousness of the invention for the production of TAA, that this is not commensurate with the scope of the claims. However, it is submitted that there is no reason for one skilled in the art to believe that the benefits of the claimed invention that were illustrated for the hydration of isoamylene in the Examples set out in the application would only be applicable to that particular chemical reaction. Indeed, the man skilled in the art would have expected that the benefits would accrue across the range of processes defined in claim 12. This is because he would know that the substitution of polymeric material for steel in the second functionality elements would have had little or no effect on the chemical reaction as taught by Crossland, so that the benefits seen would have to be the result of the physical behavior of the reactants.

In this regard, see page 7, lines 13-18 of the application where it is noted that structured multi-purpose packings according to the invention resulted in "a longer

service life of the catalyst" compared to using structured multi-purpose packings in which the walls of the chambers of the second functionality elements are not a polymer material, but a metal, for example steel. This is a physical improvement, not a chemical one, so one skilled in the art would know it would not only occur when TAA was being produced. Accordingly, it is submitted that applicants have by the noted examples demonstrated the unobviousness of the present invention. See also the comments on page 9, last five lines of the specificaiton.

It is believed claims 12-24 are patentable over Gorak in view of Crossland and are in condition for allowance. Such action is therefore requested.

If there is any fee due in connection with the filing of this Preliminary Amendment, please charge the fee to our Deposit Account No. 06-0916.

Respectfully submitted,

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